Background and Instructions For Breakout Sessions

Small **A**ircraft **T**ransportation **S**ystem

Planning Conference

NASA Langley Research Center

June 21-24, 1999

Project Management

"Planning is an unnatural process - it is much more fun to get on with it.

The real benefit of not planning is that failure comes as a complete surprise and is not preceded by months of worry."

Sir John Harvey-Jones

Breakout Session Objectives

- Validate/change current baseline assumptions
  - Roadmap strawman goals and objectives
  - State-of-the-Art technologies
  - Identify other technologies needed to achieve SATS vision
- Define your technology area's goals and objectives
  - Does your technology area have the "right" scope
  - Identify other technology areas needed to achieve these goals and objectives
  - Note any potential obstacles or roadblocks to achieve goals and objectives
- Define key "milestones" for achieving goals and objectives
  - Initial SATS plan will go through FY07
  - Technologies should be at least state-of-the-art
- Prioritize technologies (see next chart)
- Identify the certification issues associated with this technology area
- Don't create a detailed implementation plan

Prioritization Methodology

- Prioritize technologies into one of three categories:
  - Critical for SATS to achieve the National Roadmap goals
  - Highly desirable but not a roadblock to achieving the SATS goal
  - Would truly make SATS state-of-the-art but not necessary to achieving the Roadmap goals

- In addition, rank the SATS technologies in order of impact time frame.Technologies should be at least state-of-the-art. Impact should be considered in terms of the following time frames for payoff:
  - Near Term: 2001-2004
  - Mid Term: 2004-2007
  - Far Term: Beyond 2007

- And finally, identify the specific "Public Good" metric(s) that each technology addresses:
  - Mobility/Accessibility (the ability to go where you want, when you want, fast)
  - Capacity (Utility and efficiency of the National Airspace System including General Aviation airports)
  - Environment (Noise and emissions)
  - Safety (Real and perceived)
  - Land Use
  - Energy Use

Technology Readiness Levels

9   Actual system "flight proven" on operational flight

8   Actual system completed and "flight qualified" through test and demonstration

Product Refinement

Typical End of NASA Involvement

7   System prototype demonstrated in flight

6   System/subsystem model or prototype demonstrated in a relevant environment

5   Component (or breadboard) validation in a relevant environment

4   Component and/or breadboard validation in a laboratory environment

Focused Program

3   Analytical & experimental critical function and/or characteristic proof-of-concept

2   Technology concept and/or application formulated

1   Basic principles observed and reported

Base R&T

Definitions

- State-of-the-Art

    – Cutting edge but mature technologies

    – Typically TRL 6-7

- State-of-Practice

    – Technologies that are in current, widespread use

    – Typically TRL > 9

Vehicle Technologies - Airframe
Low-Cost Manufacturing Technology

Goal - This is a goal statement that is specific to the subject topic. An example might be, "Reduce the SAT vehicle airframe cost by an order of magnitude from $xx/lb to $yy/lb by 2008". This may come directly from the strawman SATS roadmap or the breakout session could choose to modify or completely change the strawman goals. If so, a good rationale for why should be included.

1999 Baseline - Refers specifically to today's state-of-the-art (SOA) (TRL 6-7) and state-of-practice (SOP) (TRL 9-10) in the subject breakout session topic. For example, today's aluminum manufacturing technology used in the automotive industry is certainly low cost and perhaps at a TRL of 9-10 however, the tolerances required for laminar flow may require new manufacturing processes that are today only TRL 3-4 or are very expensive. Composites are certainly new and allow nearly unlimited design freedom but what about cost? (Remember the goal). This paragraph is intended to capture the current level of maturity in both technology development (SOA) and commercial off-the-shelf products (SOP) in the subject topic area.

Objectives - This is a statement of purpose or intent and is generally more specific than a goal in that it more clearly says 'what' and 'how' the goal will be achieved for this particular breakout session topic; in this case 'airframe'. An example might be to "develop and demonstrate low cost high-volume aluminum maufacturing techniques & processes which meet stringent tolerances requirements necessary to achieve designed levels of laminar flow".

Approach - This paragraph is a general description of how the objectives will be accomplished. For example, "bring together industry automotive manufacturing designers and aerospace university faculty and students to collaborate on a SATS airframe manfacturing concept which utilizes industrial virtual design tools to simulate the manufacturing processes. The processes designed will be prototyped and used to build (in low volume) full-scale SATS vehicle parts for the flight demonstration vehicle.

Milestones - The milestones shown here are the necessary steps leading to the accomplishment of the objectives and ultimately the goal. They should be stated as deliverables and a timeframe (qtr/yr) should be estimated with perhaps one milestone per year or every two-years as a guideline.

2Q/02	Complete manufacturing processes design and simulations
4Q/03	Prototype manufacturing process assembled
3Q/04	First full-scale airframe completed using prototype manufacturing processes

Issues - During the breakout sessions, many issues will arise that cannot be resolved in the time available. The purpose of this paragraph is to capture those issues for future workshops or planning teams to discuss and resolve.

Breakout Sessions

NASA Office of
Aero-Space Technology

Topic Area	Lead	Location
Airframe	Tom Freeman	PYT, Curtis Room
Aerodynamics & Control	Harry Morgan	PYT, Shuttle Room
Propulsion	Leo Burkardt	PYT, Bell Room
Avionics	Dan DiCarlo	RCC, Main Auditorium
Training	Tom Glista	RCC, Main Lounge
CNS Technologies	Dean Resch	RCC, Hampton Room
Landing Facilities	Ken Stackpoole	RCC, Wythe Room
Airspace/Procedures/ATM	Jim Rowlette	RCC, Langley Room

PYT - Pearl Young Theater
RCC - Reid Conference Center